PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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WIPO PCT

Applicant's or agent's file reference 94947/MRO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU2003/001019	International Filing Date *(day/month/year)* 12 August 2003	Priority Date *(day/month/year)* 12 August 2002

International Patent Classification (IPC) or national classification and IPC

Int. Cl. [7] C07K 19/00; A61K 39/145, 39/29, 39/02, 39/00; A61P 31/14, 31/16, 35/00

Applicant

THE COUNCIL OF THE QUEENSLAND INSTITUTE OF MEDICAL RESEARCH et al

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheet(s).

3. This report contains indications relating to the following items:

I	☒	Basis of the report
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☐	Lack of unity of invention
V	☒	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	☐	Certain documents cited
VII	☐	Certain defects in the international application
VIII	☐	Certain observations on the international application

Date of submission of the demand	Date of completion of the report
22 January 2004	10 December 2004
Name and mailing address of the IPEA/AU	Authorized Officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	**L.F. McCAFFERY** Telephone No. (02) 6283 2573

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001019

I. Basis of the report

1. With regard to the elements of the international application:*

[X] the international application as originally filed.

[ ] the description, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of

[ ] the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages , received on with the letter of

[ ] the drawings, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of

[ ] the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

[ ] the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

[ ] the language of publication of the international application (under Rule 48.3(b)).

[ ] the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

[ ] contained in the international application in written form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readable form.

[ ] The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. [ ] The amendments have resulted in the cancellation of:

[ ] the description, pages

[ ] the claims, Nos.

[ ] the drawings, sheets/fig.

5. [ ] This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001019

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 4, 10 to 25, 27, 31 to 33, 36, 38, 39, 44 to 51, 53, 55, 57 to 100	**YES**
	Claims 1 to 3, 5 to 9, 26, 28 to 30, 34, 35, 37, 40 to 43, 52, 54 and 56	**NO**
Inventive step (IS)	Claims	**YES**
	Claims 1 to 100	**NO**
Industrial applicability (IA)	Claims	**YES**
	Claims 1 to 100	**NO**

2. Citations and explanations (Rule 70.7)

The present claims define lipopeptides comprising a T-helper cell epitope and a cytotoxic T cell (CTL) epitope, in which one or more internal lysine (or lysine analogue) residues is covalently attached to a lipid moiety via the epsilon-amino group or terminal side-chain group. The resulting lipopeptides are employed in compositions and methods to elicit an immune response.

The following citations are referred to in this report:

D1 E. BORGES *et al.*, Journal of Immunological Methods, 173 (1994) pp. 253-263

D2 J.-P. SAUZET *et al.*, Vaccine, 13(14), pp. 1339-1345 (1995)

D3 A. VITIELLO *et al.*, J. Clin. Invest., (1995), 95, pp. 341-349

D4 F.-A. LE GAL *et al.*, Int. J. Cancer, 98, pp. 221-227 (2002)

D5 WO 1993/022343

D1 discloses polyepitopic constructs which may be used as vaccines, in which the immune response induced by the CTL epitope is investigated in the presence of T-helper epitopes and lipophilic groups. Two specific peptides of this type are given in Table 1, referred to as lipopeptide type C. These comprise CTL and Th epitopes linked via a P2C-type lipamino group. These render present claims 1 to 3, 5 to 9, 26, 28 to 30, 34, 35, 37, 40 to 43, 52, 54 and 56 lacking in novelty. The claims as a whole lack inventive step in view of D1 since it clearly shows that peptides comprising CTL and Th epitopes linked via an internal lipamino-modified lysine may be used to elicit an immune response. The problem to be solved in the present case is the enhancement of the immune response provided by antigens comprising a CTL epitope. The skilled person is in this case an immunologist, and they would be expected to be able to ascertain the citation by a routine search of antigens comprising CTL epitopes. On reading the document the skilled person would regard the information provided as being relevant to the solution of the present problem, and would as a matter of routine arrive at the present invention. Accordingly the claims as a whole lack inventive step in view of D1.

Citations D2 to D4 each discloses various polyepitopic constructs having CTL and Th epitopes and modified by lipophilic groups. The resulting constructs are used to elicit immunogenic responses for anti-cancer, anti-HBV and anti-viral applications. None of these constructs is modified in an internal lysine positions, but are at terminal positions. Accordingly the claims are considered novel in view of each of these citations.

Continued.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of V.2

However, the present claims as a whole lack inventive step when the teaching of each of citations D2 to D4 is combined with the teaching of D1. Each of citations D2 to D4 discloses that polyepitopic peptides with Th and CTL epitopes may be modified with lipophilic groups to provide immunogenic proteins. D1 discloses that the lipophilic group may also be attached via and internal lysine radical. The skilled person would as a matter of routine combine the teaching of D1 to the teachings of D2 to D4 to arrive at the constructs defined by the present claims. Accordingly the claims as a whole lack inventive step.

D5 discloses polyepitopic constructs in which epitopes are attached to a dendrimeric core that is further attached to a lipophilic group. The lipophilic group is attached via an internal lysine. The description describes various B cell and T-cell epitopes, but does not provide a clear disclosure of constructs in which Th and CTL epitopes are provided in different peptide sequences. Accordingly the present claims may be considered both novel and inventive in view of D5.

The claims are considered industrially applicable in view of the purported pharmaceutical use of the constructs.